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with them when they are applied in a general proof of the addition theorems, based on a method quite generally followed by continental writers. Recognizing the value of the 'solution of triangles,' a good deal of space has been devoted to this subject, and an attempt has been made to develop it in such a manner that the students can appreciate the reasons for the different methods that are discussed.

"On the question of 'applied problems,' I have taken a definite position. I do not think it feasible to introduce into an elementary text technical material from applied sciences, important though such material may be. Without such material, however, applications cannot well be anything but problems which use the language of the applied sciences without really belonging to them. An elementary text can render useful service, even to applied science, by stressing the fundamental concepts of trigonometry and by setting problems which connect with the student's actual experience and which suggest ways in which these concepts may be applied, leaving actual applications to the fields to which they belong.

"It has not seemed desirable to add to the number of tables of logarithms already available. The elementary treatment of logarithms in Chapter III and the problems scattered throughout the book call for the use of a set of five-place tables, of which there are many excellent ones in existence.

"No attempt at logical completeness has been made, but rather has it been my aim to adapt the treatment to the stage of logical development which may be expected of students who begin the study of trigonometry. I am aware of the fact that a fuller discussion might be made in several instances and I shall be happy if the treatment as given should arouse the critical powers of some students and develop in them a desire for more penetrating analysis.

"The material as here presented was used originally in mimeographed form by a few classes in the University of Wisconsin."

Contents—Chapter I: Positive and negative lines and angles. Coördinates. Radian measurement, 1–8; II: The trigonometric ratios. Simple identities, 9–19; III: Logarithms, 20–31; IV: Solution of right triangles. Applications, 32–40; V: The graphs of the trigonometric functions, 41–54; VI: The addition formulæ, 55–64; VII: The solution of triangles, 65–89; VIII: Inverse trigonometric functions. Trigonometric equations, 90–103; List of answers to the exercises, 105–108; Index, 109–110.

Elements of Map Projection with Applications to Map and Chart Construction.

By C. H. DEETZ and O. S. ADAMS. (Department of Commerce, U. S. Coast and Geodetic Survey, serial no. 146, special publication no. 68.) Washington, Government Printing Office, 1921. Royal 8vo. 163 pp. + 8 plates. Price \$50.

Preface: "In this publication it has been the aim of the authors to present in simple form some of the ideas that lie at the foundation of the subject of map projections. Many people, even people of education and culture, have rather hazy notions of what is meant by a map projection, to say nothing of the knowledge of the practical construction of such a projection.

"The two parts of the publication are intended to meet the needs of such people; the first part treats the theoretical side in a form that is as simple as the authors could make it; the second part attacks the subject of the practical construction of some of the most important projections, the aim of the authors being to give such detailed directions as are necessary to present the matter in a clear and simple manner.

"Some ideas and principles lying at the foundation of the subject, both theoretical and practical, are from the very nature of the case somewhat complicated, and it is a difficult matter to state them in a simple manner. The theory forms an important part of the differential geometry of surfaces, and it can only be fully appreciated by one familiar with the ideas of that branch of science. Fortunately, enough of the theory can be given in simple form to enable one to get a clear notion of what is meant by a map projection and enough directions for the construction can be given to aid one in the practical development of even the more complicated projections.

"It is hoped that this publication may meet the needs of people along both of the lines indicated above and that it may be found of some interest to those who may already have a thorough grasp of the subject as a whole."

Contents—Part I: General statement, 7–8; Analysis of the basic elements of map projection, 9–21; Representation of the sphere upon a plane, 22–29; Elementary discussion of various forms

of projection, 30-52. *Part II*: Introduction, 53-57; The polyconic projection, 58-66; The Bonne projection, 67-70; The Lambert zenithal (or azimuthal) equal-area projection, 71-76; The Lambert conformal conic projection with two standard parallels, 77-86; The Grid system of military mapping, 87-90; The Albers conical equal-area projection with two standard parallels, 91-100; The Mercator projection, 101-136; Fixing position by wireless directional bearings, 137-139; The gnomonic projection, 140-145. *World maps*: The Mercator projection; The stereographic projection; The Aitoff equal-area projection of the sphere; The Mollweide homolographic projection; Goode's homolographic projection (interrupted) for the continents and oceans; Lambert projection of the northern and southern hemispheres; Conformal projection of the sphere within a two-cusped epicycloid; Guyou's doubly periodic projection of the sphere, 146-160. Index, 161-163.

Examples in Differential and Integral Calculus with Answers. By the late C. S. JACKSON. (Longmans' Modern Mathematical Series.) London and New York, Longmans, Green and Co., 1921. 8vo. 8 + 142 pages. Price \$3.25.

First paragraphs of preface by W. M. Roberts: "This collection of Examples in the Calculus, which was made by the late Mr. C. S. Jackson, should have been published in 1917. Mr. Jackson's sudden and regrettable death in October, 1916 [see this MONTHLY 1917, 144] caused the publication to be delayed till after the War. The book is hampered by having to be put through the press by other hands than the author's.

"A great many of those examples which can be classed as problems were constructed by Mr. Jackson himself in connection with his work at the Royal Military Academy, Woolwich, and the many public examinations in which he took part. Many of them are very neat applications of the Calculus to practical problems, and it is hoped that these will prove particularly useful to teachers who require, in their work, a number of examples which are not mere Algebraical manipulations. Many books on the Calculus treat the subject chiefly as an extension of Algebra and Analytical Geometry. This collection should be a useful supplement to such books."

Contents—*Part I, Differential Calculus*, 1-53: Differentiation; tangents and slopes; dy/dx as a rate of increase; easy maxima and minima; velocity; differentiation of logarithms; errors and rates; approximation to roots of equations; Newton's method of approximating to the roots of an equation; maxima, minima; harder questions on tangents and normals; errors; velocity; miscellaneous examples; successive differentiation; the theorem of Leibnitz; miscellaneous expansions; indeterminate forms; Taylor's theorem and applications; curvature; examples on maps; partial differentiation. *Part II, Integral Calculus*, 54-120: Known results of differentiation; methods of integration; hyperbolic functions; integration; areas; planimeters and integragraphs; areas and volumes; volumes; problems on simple integration; mean values; rectification and areas of surfaces; centers of gravity; second moments, or moments of inertia; center of pressure; pendulum; differential equations; double and triple integration. *Answers*, 121-142.

This work is one of the Series containing G. B. Mathews's *Projective Geometry* (1914), Hilda P. Hudson's *Ruler and Compasses* (1916), H. S. Carslaw's *Elements of Non-Euclidean Geometry* (1916), and H. Bateman's *Differential Equations* (1918).

Higher Mechanics. By HORACE LAMB. Cambridge, at the University Press, 1920. 8vo. 10 + 272 pages. Price 21 shillings.

Preface: "This book treats of three-dimensional Kinematics, Statics, and Dynamics in what I think a natural, as I have found it to be a convenient, order. It may be regarded as a sequel to two former treatises¹ to which occasional reference is made; but it is not dependent on these, and will I trust be readily followed by students who are conversant with ordinary two-dimensional Mechanics.

"The subject is of course a very wide one, and some principle of selection is necessary. I have tried to confine myself to matters of genuine kinematical or dynamical importance, avoiding developments whose interest, often considerable, is purely mathematical or now mainly historical. It is owing to such considerations that whilst some account is given of the Theory of Screws, of Null-Systems, and of Least Action, on the other hand brachistochrone problems, and the general theory of the Differential Equations of Dynamics, are left untouched.

"The book does not claim to be more than an elementary one, regard being had to the nature

¹ "Statics, Cambridge, 1912, and Dynamics, Cambridge, 1914."